UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/685,987	10/15/2003	Paresh Chatterjee	02-6471	7117

7590 08/10/2006

LSI Logic Corporation
Corporate Legal Department
Intellectual Property Services Group, M/S D-106
1621 Barber Lane,
Milpitas, CA 95035

EXAMINER
LAMARRE, GUY J

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 08/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/685,987	Applicant(s) CHATTERJEE ET AL.	
	Examiner Guy J. Lamarre	Art Unit 2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2003*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.
  4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-22* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *15 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  a)☐ All b)☐ Some * c)☐ None of:
    1.☐ Certified copies of the priority documents have been received.
    2.☐ Certified copies of the priority documents have been received in Application No. _____.
    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

* Pursuant to 35 USC 131, **Claims 1-22** are presented for examination.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

1.1 **Claims 1-22** are rejected under 35 U.S.C. 102(e) as being anticipated by (USPGPub # 2003/0237019, filed June 24, 2002) to **Kleiman et al.**

As per Claims 1-22, Kleiman et al. discloses equivalent array migration approach , e.g., in Fig. 2 wherein stripe position is computed via plural means, XOR, modulo operation.

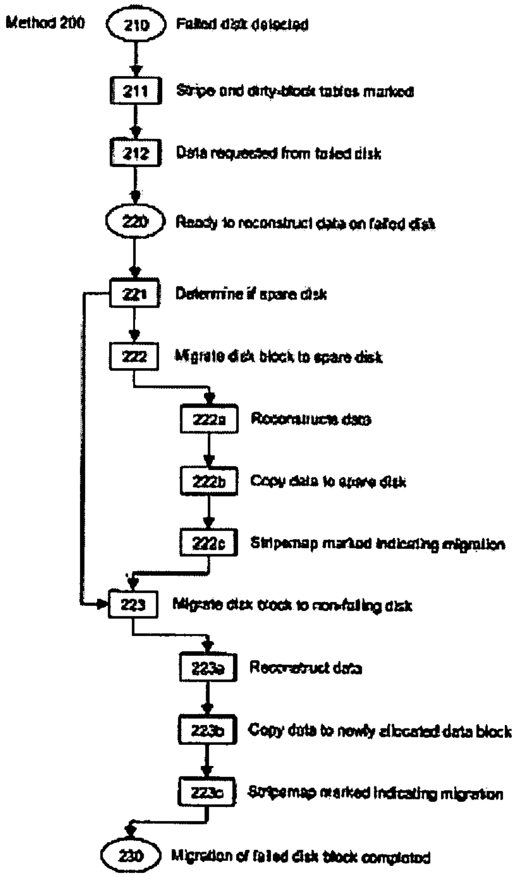

Method 200
210 Failed disk detected
211 Stripe and dirty-block tables marked
212 Data requested from failed disk
220 Ready to reconstruct data on failed disk
221 Determine if spare disk
222 Migrate disk block to spare disk
222a Reconstructs data
222b Copy data to spare disk
222c Stripemap marked indicating migration
223 Migrate disk block to non-failing disk
223a Reconstruct data
223b Copy data to newly allocated data block
223c Stripemap marked indicating migration
230 Migration of failed disk block completed

Fig. 2

Kleiman et al. discloses that '*Parity is preferably calculated as the sum modulo 2, also known as the exclusive-or ("XOR"), of all data in the disk blocks 142 in the RAID stripe 143. Therefore, inserting a new disk block 142 that is all zero does not change parity in the RAID stripe 143.*"

1.2 **Claims 1-22** are rejected under 35 U.S.C. 102(e) as being anticipated by (USPGPub # 20030188097, filed March 29, 2002) to **Holland et al.**

As per Claims 1-22, Holland et al. discloses equivalent array migration approach , e.g., in Fig. 8 wherein stripe position is computed via plural means, XOR, modulo operation.

Holland et al. discloses, as seen e.g. in Figs. 8a.c, '*data storage methodology wherein a data file is initially stored in a format consistent with RAID-1 and RAID-X and then migrated to a format consistent with RAID-X and inconsistent with RAID-1 when the data file grows in size beyond a certain threshold. Here, RAID-X refers to any non-mirrored storage scheme employing XOR-based error correction coding (e.g., a RAID-5 configuration).*

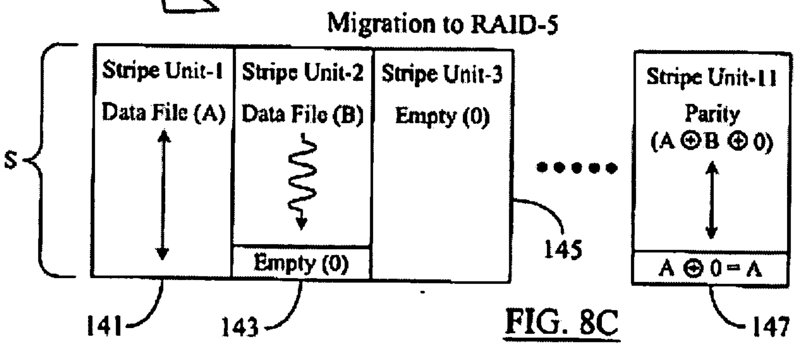


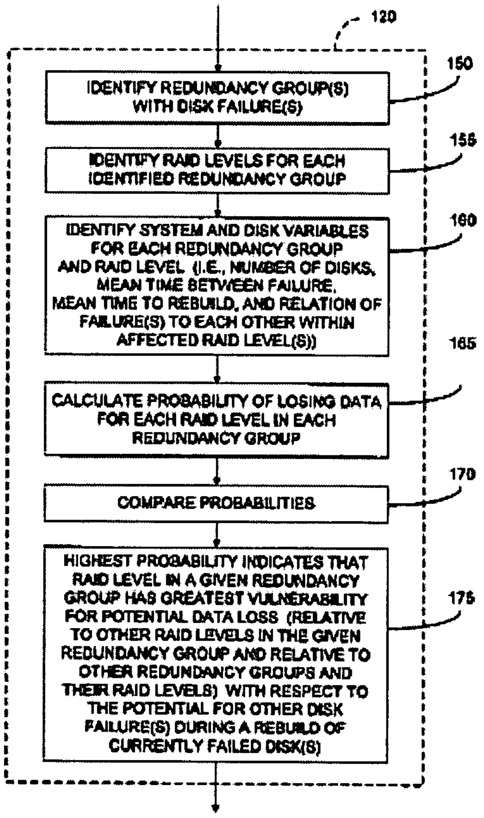
FIG. 8C

Each component object (including the data objects and the parity object) for the data file is configured to be stored in a different stripe unit per object-based secure disk. Each stripe unit may store, for example, 64 KB of data. So long as the data file does not grow beyond the size threshold of a stripe unit (e.g., 64 KB), the parity stripe unit contains a mirrored copy of the data stored in one of the data stripe units because of the exclusive-ORing of the input data with "all zeros" assumed to be contained in empty or partially-filled stripe units. When the file grows beyond the size threshold, the parity stripe unit starts storing parity information instead of a mirrored copy of the file data. Thus, the data file can be *automatically migrated from a format consistent with RAID-1 and RAID-X to a format consistent with RAID-X and inconsistent with RAID-1 without the necessity to duplicate or rewrite the stored data.*

1.3 **Claims 1-22** are rejected under 35 U.S.C. 102 as being anticipated by (USP # 6516425) to **Belhadj et al.**

As per Claims 1-22, Belhadj et al. discloses equivalent array migration approach , e.g., in Fig. 3 wherein stripe position is computed via plural means, XOR, modulo operation.

FIG. 3


120
150
IDENTIFY REDUNDANCY GROUP(S) WITH DISK FAILURE(S)
155
IDENTIFY RAID LEVELS FOR EACH IDENTIFIED REDUNDANCY GROUP
160
IDENTIFY SYSTEM AND DISK VARIABLES FOR EACH REDUNDANCY GROUP AND RAID LEVEL (I.E., NUMBER OF DISKS, MEAN TIME BETWEEN FAILURE, MEAN TIME TO REBUILD, AND RELATION OF FAILURE(S) TO EACH OTHER WITHIN AFFECTED RAID LEVEL(S))
165
CALCULATE PROBABILITY OF LOSING DATA FOR EACH RAID LEVEL IN EACH REDUNDANCY GROUP
170
COMPARE PROBABILITIES
175
HIGHEST PROBABILITY INDICATES THAT RAID LEVEL IN A GIVEN REDUNDANCY GROUP HAS GREATEST VULNERABILITY FOR POTENTIAL DATA LOSS (RELATIVE TO OTHER RAID LEVELS IN THE GIVEN REDUNDANCY GROUP AND RELATIVE TO OTHER REDUNDANCY GROUPS AND THEIR RAID LEVELS) WITH RESPECT TO THE POTENTIAL FOR OTHER DISK FAILURE(S) DURING A REBUILD OF CURRENTLY FAILED DISK(S)

Belhadj et al. discloses that '*With data migration, the administrator is afforded tremendous flexibility in defining operating conditions and establishing logical storage units (or LUNs). As one example, this type of RAID system can initially store user data according to the optimum performing RAID 1 configuration. As the user data approaches and exceeds 50% of a stripe set or redundancy group array capacity, the system can then begin storing data according to both RAID 1 and RAID 5, and dynamically migrating data between RAID 1 and RAID 5 in a* *continuous manner as* *storage* *demands change. At any one time during operation, the data might be stored as RAID 1 or RAID 5 or both on all of the disks. The mix of RAID 1 and RAID 5 storage changes dynamically with the data I/O and storage capacity. This allows the system to dynamically optimize performance and available capacity versus an increasing amount of user data.'*

CONCLUSION

* Any response to this action should be mailed to:

Commissioner of Patents and Trademarks, Washington, D.C. 20231

or faxed to: (571) 273-8300 for all formal communications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guy J. Lamarre, P.E., whose telephone number is (571) 272-3826. The examiner can normally be reached on Monday to Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert De Cady, can be reached at (571) 272-3819.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-3609.

Information regarding the status of an application may also be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Guy J. Lamarre, P.E
Primary Examiner
7/10/2006